



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A01J 50/17	A2	(11) International Publication Number: WO 96/11568 (43) International Publication Date: 25 April 1996 (25.04.96)
---	-----------	--

(21) International Application Number: PCT/NL95/00343

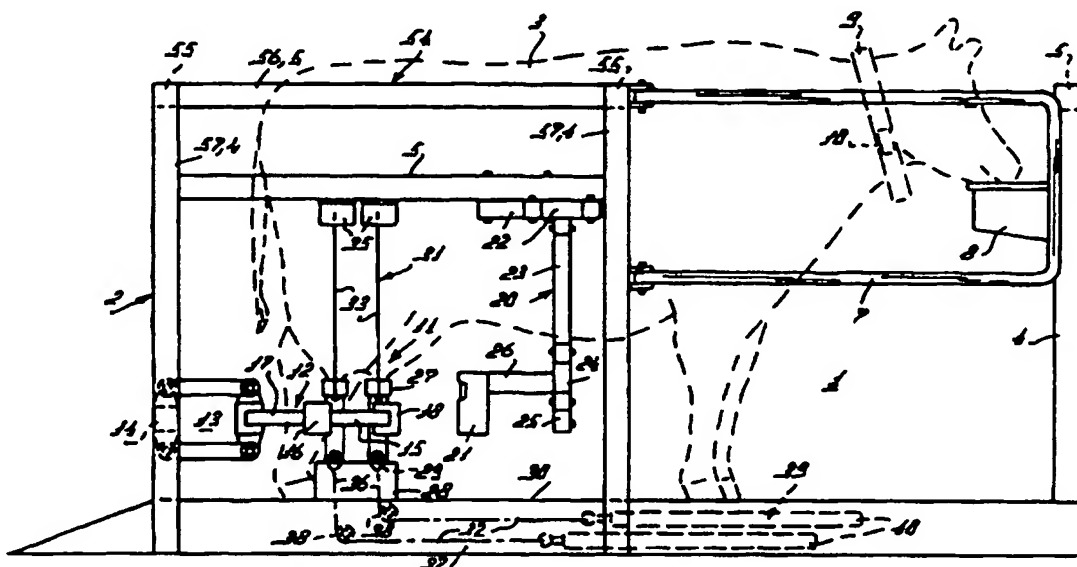
(22) International Filing Date: 9 October 1995 (09.10.95)

(30) Priority Data:
9401681 12 October 1994 (12.10.94) NL(71) Applicant (for all designated States except US): MAASLAND
N.V. [NL/NL]; Weverskade 10, NL-3155 PD Maasland
(NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): VAN DER LELY, Cornelis
[NL/CH]; Brüschenrain 7, CH-6300 Zug (CH).(74) Agent: MULDER, Herman; 10 Weverskade, NL-3155 PD
Maasland (NL).(81) Designated States: JP, US, European patent (AT, BE, CH, DE,
DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).**Published***Without international search report and to be republished
upon receipt of that report.*

(54) Title: A METHOD OF AND AN IMPLEMENT FOR AUTOMATICALLY MILKING ANIMALS, SUCH AS COWS



(57) Abstract

The invention relates to a method of milking animals, such as cows, whereby, by means of a milking robot (1), at least one teat cup (27) is connected to a teat of an animal to be milked. After foremilked, the teat cup (27) is cleaned, whereupon the teat cup (27) is reconnected to the teat in question and the corresponding udder quarter is milked out.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LJ	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

A METHOD OF AND AN IMPLEMENT FOR AUTOMATICALLY MILKING ANIMALS,
SUCH AS COWS

The present invention relates to a method of milking animals, such as cows, whereby, by means of a milking robot, at least one teat cup is connected to a teat of an animal to be milked.

5 Such methods are well-known.

 In adopting a method as mentioned above, the foremilk obtained with the teat cups, i.e. the squirts of milk being the first ones obtained by means of the teat cup, is generally mixed with the milk obtained subsequently with a teat cup and
10 jointly stored in a milk tank. It is generally known that especially the foremilk of some animals can have a high germ count. Mixing the foremilk with the other milk is undesirable, because this results eventually in milk of a lower quality.

 The present invention has for its objective to
15 provide a method as mentioned above, by which it is feasible to obtain milk of high purity and quality.

 According to the invention, this is achieved through a method by which, after foremilking, the teat cup is cleaned. According to the invention, a method is adopted, by means of
20 which, after foremilking, the teat cup is disconnected and cleaned, whereupon the teat cup is reconnected to the teat and the corresponding udder quarter is milked (out), after which the teat cup is cleaned again. In particular, the reconnection of the teat cup to the teat, according to the invention, can
25 take place by means of the milking robot; after milking out the

relevant udder quarter, the teat cup is preferably cleaned again before it is connected anew to a teat by means of the milking robot. Owing to the fact that by the above method the teat cups, and possibly the milk lines, are purged of the
5 remnants of foremilk, it is prevented that any mixture of foremilk and milk obtained subsequently takes place, which increases the purity and, connected herewith, the quality of the milk suitable for consumption. Owing to the fact that upon milking (out) the udder quarter, i.e. upon completion of the
10 milking, the teat cup is first cleaned before it is anew connected to a different teat, it is prevented that remnants of milk from one animal come into contact with the teats of any other animal; for this could cause that diseases are carried from one animal to the other. By adopting a method, according
15 to the invention, by which the teat cup is cleaned immediately upon termination of the milking, the remnants of milk of the relevant milking are also prevented from decaying and subsequently coming possibly into contact with the teats of a next animal to be milked. According to the invention, a method
20 is adopted, by which the foremilk and the milk suitable for consumption are discharged into separate tanks.

The invention further relates to an implement for milking animals, such as cows, comprising one or a plurality of milking robots, characterized in that the implement is designed
25 in such a way that during a milking a teat cup is cleaned at least twice. In this manner, a high purity of the teat cup and of the milk is obtained, and remnants of the foremilk are prevented from mixing with the milk suitable for consumption which is to be obtained subsequently. According to a further
30 feature of the invention, the cleaning implement comprises teat cup cleaners which are connectable to a teat cup by means of a cylinder. According to still another feature of the invention, the teat cup cleaners are disposed vertically movable near a side of the milking parlour.

35 According to yet another aspect of the invention, the implement comprises a construction for foremilking, enabling to discharge the first few squirts of foremilk into a separate reservoir from the milk suitable for consumption. Accordingly,

the invention also relates to an implement for milking animals, such as cows, comprising one or more milking robots and a computer, characterized in that the implement comprises a construction for foremilk, enabling to discharge the first few squirts of foremilk into a separate reservoir from the milk suitable for consumption. For the purpose of discharging the foremilk separately, according to another feature of the invention, the foremilk construction comprises a computer-controlled three-way cock, by means of which the teat cup can be connected to a separate reservoir for the storage of foremilk. To prevent that the milk tube, through which the milk suitable for consumption is discharged, is contaminated with the foremilk, the three-way cock is disposed on or near the teat cup, according to a feature of the invention. For the purpose of switching the three-way cock, according to a further feature of the invention, the foremilk construction comprises a timing circuit which defines a time interval for obtaining the foremilk, and/or a sensor, such as a flow sensor, by means of which it can be established whether a few squirts of foremilk have been obtained through the teat cup. In order to discharge the foremilk and the milk suitable for consumption separately, the implement according to the invention comprises a foremilk construction including a teat cup provided with at least two milk lines, one of them being intended for the discharge of foremilk.

According to a further feature of the invention, the implement comprises a holder on which the teat cups are arranged after a milking, which holder is provided with a recess which is preferably conical and corresponds with the shape of the underside of a teat cup. According to still another feature of the invention, a teat cup is provided with means of transport, with the aid of which the teat cup during motion is kept in an approximately upright position, which means of transport comprise at least two cables connected with the teat cups. It is thus achieved that the upper end of the teat cup does not easily come into contact with the floor of the milking parlour, which is conducive to milk of a higher quality. According to a further feature of the invention, one

cable, which extends essentially vertically, is connected with the milking parlour and one cable extends essentially horizontally, transversely to the longitudinal direction of the milking parlour. According to a further feature of the invention, the means of transport are provided with a withdrawing member which is disposed near the longitudinal side of the milking parlour and which comprises a cylinder connected with an end of the cable extending essentially horizontally. According to still another feature of the invention, near each longitudinal side of the milking parlour there are provided two preferably pneumatic cylinders extending in the longitudinal direction of the milking parlour. In order to meet with the least possible resistance from the milk/pulsation tubes during the movements of the teat cups, according to another feature of the invention, a teat cup is provided with milk and/or pulsation tubes which are pivot-mounted near the upper side of the milking parlour. Accordingly, the invention also relates to an implement for milking animals, such as cows, comprising one or more milking robots, one or more milking parlours, a computer and teat cups, characterized in that milk and/or pulsation tubes of the teat cup are pivot-mounted near the upper side of the milking parlour. According to a feature of the invention, the hinge construction, by means of which the milk and/or pulsation tubes are pivot-mounted on the milking parlour, is disposed at a certain distance from the longitudinal side of the milking parlour. According to still another feature of the invention, the milk and/or pulsation tubes are placed in a U-section. In the exemplary embodiment of the invention, the U-section is in the shape of an isosceles triangle. According to a further feature of the invention, the pulsation tube is placed along one leg of the isosceles triangle and the milk tube(s) along the other leg.

According to another aspect of the invention, the milking robot is provided with at least two robot arms equipped with a gripper, by means of which the teat cups are capable of being coupled to the teats of an animal to be milked. According to a further feature of the invention, the gripper is provided with a recess curved in accordance with the shell of a teat cup

and the gripper comprises an electromagnet. According to a feature of the invention, a robot arm is disposed on each side of the milking parlour in order to enhance the speed of coupling. The implement according to the invention comprises a robot arm provided with a detector, such as a laser sensor, to determine the positions of the teats of an animal to be milked. According to a further feature of the invention, the robot arm provided with the detector is disposed on a longitudinal side of the milking parlour and the robot arm is movable in height.

The invention will now be further explained with reference to the accompanying drawings, in which:

Figure 1 is a plan view of an implement for milking animals, which implement is provided with a milking robot having on each longitudinal side a gripper for seizing the teat cups;

Figure 2 shows a side view of the implement for milking animals according to Figure 1, in which view the means of transport keeping the teat cups during travel in an upright attitude are clearly discernible;

Figure 3 shows a rear view of the milking parlour in accordance with line III-III in Figure 1, and

Figure 4 also is a rear view of the milking parlour in operation, showing the teat cup cleaners and the pivot-mounted milk and pulsation tubes.

Figure 1 shows a plan view of a milking parlour 1 with a fencing 2 enclosing an animal 3, a cow in the present case. As is depicted in Figure 2, the fencing 2 comprises posts 4 and, in between the rear posts 4 and the central posts 4, cross beams 5 are placed at a certain distance from and parallel to each other. The milking parlour 1 is provided with an entrance door 6 on the rear side and exit doors 7 on the two longitudinal sides. Upon opening, the exit doors 7 connect the milking parlour 1 with one and the same room or each of them connects it with a separate room, such as e.g. an isolation room and the cowhouse. On a cross beam 5 near the front side of the milking parlour 1 there is also provided a feed trough 8, wherein the animal 3 can be given concentrates. For identification of the animal 3, round the neck of the animal

there is provided a collar 9 with a transmitter 10, which operates in conjunction with a (non-shown) cow recognition system.

In the vicinity of the milking parlour 1 there is
5 furthermore provided a milking robot 11, which comprises a robot arm 12 on each longitudinal side of the milking parlour 1. The robot arm 12 is via a support 14 connected with a rear post 4 by means of a parallelogram-type hinged arm construction 13. The supports 14 are disposed transversely to the longitudinal
10 direction of the milking parlour 1 on the rear posts 4. The robot arm 12 is capable of being moved vertically by means of a (non-shown) cylinder. The robot arm 12 comprises a first arm part 15 and a second arm part 17 capable of pivoting about a vertical shaft 16. On the end of the first arm part 15 there is
15 provided a gripper 19 capable of rotating about a vertical shaft 18. On one longitudinal side of the milking parlour 1 there is provided a further robot arm 20 equipped with a detector 21 for finding the teat positions of the animal 3. The further robot arm 20 comprises a first parallelogram-type
20 hinged arm construction 22 which is in a virtually horizontal position and which has one end connected with a cross beam 5 of the fencing 2 of the milking parlour 1 (Figure 1). Approximately perpendicular to the first horizontal parallelogram-type hinged arm construction 22 there is provided
25 a second parallelogram-type hinged arm construction 23 extending in a downward direction and situated in a vertical plane. The other end of the second vertical parallelogram-type hinged arm construction 23 is connected with a triangular plate 24. On a different side of the triangular plate 24 there is
30 provided a third parallelogram-type hinged arm construction 25, whose arms extend essentially horizontally and are situated in a vertical plane which is perpendicular to the milking parlour 1. On the other end of the third parallelogram-type hinged arm construction 25 there is provided a support 26, which is
35 situated in the longitudinal direction of the milking parlour 1 and to which the detector 21 is attached. In the present exemplary embodiment of the invention, the detector 21 comprises a laser. The first, second and third parallelogram-

type hinged arm constructions are capable of being operated by preferably pneumatic cylinders (not shown).

Further, the milking robot 11 is equipped with four teat cups 27, which are arranged on a teat cup carrier 28 in pairs on both sides of the milking parlour 1 when the milking robot 11 is out of operation (Figure 1). The teat cup carrier or holder 28 is provided with a conical seating 29 corresponding with the lowermost conical part of the teat cup 27. In the present exemplary embodiment, on the two longitudinal sides of the milking parlour 1 there is provided on the floor 30 beside the milking parlour 1 a holder 28 having two conical recesses or seatings 29 situated behind each other as seen in the longitudinal direction of the milking parlour 1.

Each teat cup 27 is further provided with means of transport 31, with the aid of which the respective teat cup 27 is kept continuously or virtually continuously in an approximately vertical position during the movement of the teat cup 27 to the teat cup carrier 28 and during the disconnection of the teat cup 27 from the teat. As Figure 4 shows, the means of transport 31 comprise a cable 32 extending essentially horizontally and a cable 33 extending essentially vertically. The vertical cable 33 has one end connected with a cable fastening 34, which is disposed near the top side on the shell of the teat cup 27. The other end of the vertical cable 33 is connected with a cable fastening 35, which is disposed on a cross beam 5 of the fencing 2. The cable fastening 35 is a cylindrical body, which also constitutes a guide for the end of the vertical cable 33. The length of the vertical cable 33 is dimensioned such that the upper part of the teat cup 27 cannot come into contact with the floor 30 of the milking parlour 1. In the conical part on the underside of the teat cup 27 there is provided a cable fastening, by means of which one end of the horizontal cable 32 is connected with the teat cup 27. As is shown in Figure 2, the horizontal cable 32 passes through a hole in the teat cup carrier 28. The hole has a first vertical part 36 provided in the centre of the conical seating 29 and, perpendicular thereto, a second part 37 extending in the longitudinal direction of the milking parlour 1. In the

transition area between the vertical part 36 and the horizontal part 37 there is provided a roller member 38, which supports the horizontal cable 32. The two horizontal cables 32 of one pair of teat cups 27 leave the teat cup carrier 28
5 approximately parallel to each other and extend in the longitudinal direction of the milking parlour 1 to the withdrawing members 39. In the present exemplary embodiment of the invention, the withdrawing members 39 are designed as pneumatic cylinders, but they may also be designed as hydraulic cylinders
10 or electric equivalents of cylinders. On each longitudinal side of the milking parlour 1, in the exemplary embodiment of the invention, there are provided two pneumatic cylinders 40 above each other and parallel to each other. The end of each piston rod of a pneumatic cylinder 40 comprises a cable fastening, to
15 which the horizontal cable 32 is attached (Figure 2).

The milking parlour 1 of the present exemplary embodiment of the invention is also provided with a cleaning implement 41 for cleaning the teat cups 27. The cleaning implement 41 comprises two pairs of teat cup cleaners 42 which
20 are disposed on either side of the milking parlour 1. A teat cup cleaner 42 comprises a spray head 43 placed on the piston rod of a pneumatic cylinder 44, which cylinder 44 has its other end connected with the fencing 2 of the milking parlour 1 through a lug 45. The pneumatic cylinder 44 is capable of being
25 operated by a (non-shown) computer, the arrangement being such that the spray head 43 is connected to a teat cup 27, which is located on the teat cup carrier 28 during a condition of rest. A cleaning and/or disinfecting liquid can be sprayed into or along the teat cup 27 by the spray head 43.

30 The teat cups 27 are further provided with a computer-controlled three-way cock 46, to which for each teat cup 27 two lines 47 for the discharge of milk are connected. The teat cup 27 further comprises a pulsation tube 48. The milk lines 47 and the pulsation line 48 extend virtually
35 horizontally from a teat cup 27 to a side of the milking parlour 1. Just out of the milking parlour 1, the milk tubes 47 and the pulsation tube 48 are bent upwards such that the tubes can form a triangle 49, such as an isosceles triangle. In

the present exemplary embodiment, the isosceles triangle 49 is formed by arranging the milk lines 47 and the pulsation line 48 in a U-section 50 bent into the shape of an isosceles triangle 49. The U-section 50 is on its top provided with a strip 51, of which the other end is rotatable on a horizontal pivot 52 disposed in the longitudinal direction of the milking parlour 1. The strip 51 is mounted on a beam 53 which, in turn, is mounted perpendicularly to the cross beam 5 of the fencing 2. The beam 53 is part of a U-shaped secondary fencing 54, which is connected with the fencing 2 of the milking parlour 1. As is depicted in Figure 1, the U-shaped secondary fencing 54 comprises two beams 55 mounted perpendicularly to the posts 4 and interconnected by means of a cross beam 56 on the other end. The beams 55 and the cross beam 56 are supported at the angular points by two posts 57. The U-shaped secondary fencing 54 extends from the entrance door 6 to approximately the exit doors 7.

The operation of the construction comprising the implement for milking animals as set forth hereinbefore is as follows:

After an animal 3 has entered the milking parlour 1 through the entrance door 6, the animal 3 is automatically identified by the cow recognition system by means of a transmitter 10. After the animal 3 has been identified by the cow recognition system, an amount of concentrates may be supplied to the animal 3 in the feed trough 8. Subsequently, by means of a (non-shown) computer, the robot arm 20 with the laser detector 21 thereon is swung to underneath the animal 3 and, by means of the laser detector 21, the positions of the teats of the animal 3 are determined and applied to the computer. Then the computer issues one or more signals to the two robot arms 12 which are disposed on the longitudinal side of the milking parlour 1 and which, acting on the basis of these signals, put the grippers 19 with the curved recess to close to a shell of the teat cup 27. In the present exemplary embodiment of the invention, first, the teat cups 27 to be connected to the hind teats of the animal 3 to be milked are seized. Even before the curved recess of a gripper 19 comes

near the shell of a teat cup 27, the computer issues a signal to the electromagnet of the gripper 19 so as to produce an electromagnetic field in the vicinity of the curved recess of the gripper 19. When the gripper 19 has approached the metal
5 shell of the teat cup 27 to a sufficient distance, the teat cup 27 is firmly drawn against the curved recess of the gripper 19 owing to the presence of the electromagnetic field. A change in the electromagnetic field is caused by the metal shell, whereupon a signal is issued to the computer, signifying that
10 the teat cup 27 has been coupled. The last-mentioned signal can also be issued by a different type of sensor, such as a contact sensor which is disposed in the gripper 19, or by means of a position determination through the detector 21.

The computer then issues a signal to the means of
15 transport 31 of the relevant teat cup 27, which means release the pneumatic cylinders 40 on account of this signal, the arrangement being such that the teat cup 27 can be lifted from the conical seating 29 of the teat cup carrier 28 by means of the robot arm 12 without being obstructed by the horizontal
20 cable 32. Subsequently, the teat cup 27 is moved horizontally to underneath a hind teat of the animal 3. When the teat cup 27 is moving to the teat, the vertical cable 33 swings along with the teat cup 27 and the horizontal cable 32 is also carried along. By means of the gripper 19, the teat cup 27 is then
25 connected to the teat of an animal 3 to be milked. Even before the commencement of foremilk, the computer issues a signal to the computer-controlled three-way cock 46, as a result of which the relevant teat cup 27 is put into communication with the milk line 47 for the discharge of foremilk. The foremilk is
30 discharged into a (non-shown) tank via the milk line 47. After it has been established by means of a (non-shown) flow sensor that a number of squirts of foremilk has been obtained through the teat cup 27, the foremilk is interrupted and the relevant teat cup 27 is disconnected and moved towards the teat
35 cup carrier 28 with the aid of the means of transport 31. When the teat cup 27 has been drawn into the conical seating 29, the computer issues a signal to the cleaning implement 41, whereupon the pneumatic cylinder 40 is energized and the spray

head 43 is connected to the teat cup 27, after which it is possible to start cleaning the teat cup 27 and possibly the milk line 47. After the teat cup 27 has been cleaned, the computer issues a signal to the computer-controlled three-way
5 cock 46 so as to connect the teat cup to the milk line 47 for the discharge of the milk suitable for consumption. Subsequently, the teat cup is connected in the afore-mentioned manner to the teat of the animal 3 to be milked by means of the robot arm 12, whereupon the milking can be started. After it
10 has been established by means of the flow sensor that an udder quarter is empty, the teat cup 27 is drawn back to the teat cup carrier 28 with the aid of the means of transport 31. After this, the computer again issues a signal in order that the teat cup cleaner 42 again cleans the relevant teat cup 27 before it
15 is connected again to a teat of an animal to be milked. Accordingly, the invention comprises an implement for milking animals, such as cows, using one or more milking robots, one or more milking parlours, a computer and a cleaning implement for cleaning the teat cups, characterized in that, after a teat cup
20 has been connected to a teat and milking has taken place for a certain duration of time, the computer issues a first signal to the cleaning implement in order that the cleaning implement is cleaned, while the computer issues a second signal when the milking with the relevant teat cup has been terminated,
25 whereupon the relevant teat cup is cleaned again. In another (non-shown) exemplary embodiment of the invention, it is possible that the implement for foremilk comprises a timing device included in the computer, which timing device defines a time interval for obtaining the foremilk. Owing to the fact
30 that the milk tubes 47 and the pulsation tubes 48 are hinge-mounted, the animal 3 can freely move in the milking parlour 1 when the teat cups 27 are connected and during the (fore)milking without there being a risk that a teat cup 27 is undesiredly uncoupled from the teat.

35

CLAIMS

1. A method of milking animals, such as cows, whereby, by means of a milking robot (11), at least one teat cup (27) is
5 connected to a teat of an animal to be milked, while, after foremilking, the teat cup (27) is cleaned.
2. A method according to claim 1, characterized in that, after foremilking, the teat cup (27) is disconnected and cleaned, whereupon the teat cup (27) is reconnected to the teat
10 and the corresponding udder quarter is milked (out), after which the teat cup (27) is cleaned again.
3. A method according to claim 1 or 2, characterized in that the teat cup (27) is cleaned immediately upon termination of the milking.
- 15 4. A method according to claim 1 to 3, characterized in that the foremilk and the milk suitable for consumption are discharged into separate tanks.
5. An implement for milking animals, such as cows, comprising one or more milking robots (11), characterized in
20 that the implement is designed in such a way that during a milking a teat cup (27) is cleaned at least twice.
6. An implement according to claim 5, characterized in that the cleaning implement comprises teat cup cleaners (41) which are connectable to a teat cup (27) by means of a
25 cylinder.
7. An implement according to claim 6, characterized in that the teat cup cleaners (41) are disposed vertically movable near a side of the milking parlour (1).
8. An implement according to any one of the preceding
30 claims, characterized in that the implement comprises a construction for foremilking, enabling to discharge the first few squirts of foremilk into a separate reservoir from the milk suitable for consumption.
9. An implement for milking animals, such as cows,
35 comprising one or more milking robots (11) and a computer, characterized in that the implement comprises a construction for foremilking, enabling to discharge the first few squirts of foremilk into a separate reservoir from the milk suitable for

consumption.

10. An implement according to claim 8 or 9, characterized in that the foremilking construction comprises a computer-controlled three-way cock (46) for the discharge of milk to the
5 separate reservoirs.

11. An implement according to claim 10, characterized in that the three-way cock (46) is disposed on or near a teat cup (27).

12. An implement according to any one of claims 8 to 11,
10 characterized in that the foremilking construction comprises a timing circuit which defines a time interval for obtaining the foremilk, and/or a sensor, such as a flow sensor, by means of which it can be established whether a few squirts of foremilk have been obtained through a teat cup (27).

13. An implement according to any one of claims 8 to 11, characterized in that the foremilking construction comprises a
15 teat cup (27) provided with at least two milk lines (47), one of them being intended for the discharge of foremilk.

14. An implement according to claim 13, characterized in
20 that the implement comprises a holder (28) on which the teat cups (27) are arranged after a milking, which holder (28) is provided with a recess (29) which corresponds with the underside of a teat cup (27).

15. An implement according to claim 14, characterized in
25 that the recess (29) and the underside of the teat cup (27) have a conical shape.

16. An implement according to any one of claims 5 to 15, characterized in that a teat cup (27) is provided with means of
30 transport (31), with the aid of which the teat cup (27) during motion is kept in an approximately upright position, which means of transport comprise at least two cables (32; 33) connected with the teat cup (27).

17. An implement according to claim 16, characterized in that one cable (33) is connected with the milking parlour (1)
35 and extends essentially vertically, and that one cable (32) extends essentially horizontally, transversely to the longitudinal direction of the milking parlour (1).

18. An implement according to claim 17, characterized in

that the means of transport (31) are provided with a withdrawing member (39) which is disposed near the longitudinal side of the milking parlour (1) and which comprises a cylinder (40) connected with an end of the cable (32) extending essentially horizontally.

19. An implement according to claim 18, characterized in that near each longitudinal side of the milking parlour (1) there are provided two preferably pneumatic cylinders (40) extending in the longitudinal direction of the milking parlour (1).

20. An implement according to any one of claims 5 to 19, characterized in that a teat cup (27) is provided with milk and/or pulsation tubes (47; 48) which are pivot-mounted near the upper side of the milking parlour (1).

21. An implement for milking animals, such as cows, comprising one or more milking robots (11), one or more milking parlours (1), a computer and teat cups (27), characterized in that the milk and/or pulsation tubes (47; 48) of the teat cup (27) are pivot-mounted near the upper side of the milking parlour (1).

22. An implement according to claim 20 or 21, characterized in that the hinge construction, by means of which the milk and/or pulsation tubes (47; 48) are pivot-mounted on the milking parlour (1), is disposed at a certain distance from the longitudinal side of the milking parlour (1).

23. An implement according to any one of claims 20 to 22, characterized in that the milk and/or pulsation tubes (47; 48) are placed in a U-section (50).

24. An implement according to claim 23, characterized in that an isosceles triangle (49) has been formed from the U-section (50).

25. An implement according to claim 24, characterized in that the pulsation tube (48) is placed along one leg of the isosceles triangle (49) and the milk tubes (47) are placed along the other leg.

26. An implement according to any one of claims 5 to 25, characterized in that the milking robot (11) is provided with at least two robot arms (12) equipped with a gripper (19), by

means of which the teat cups (27) are capable of being coupled to the teats of an animal to be milked.

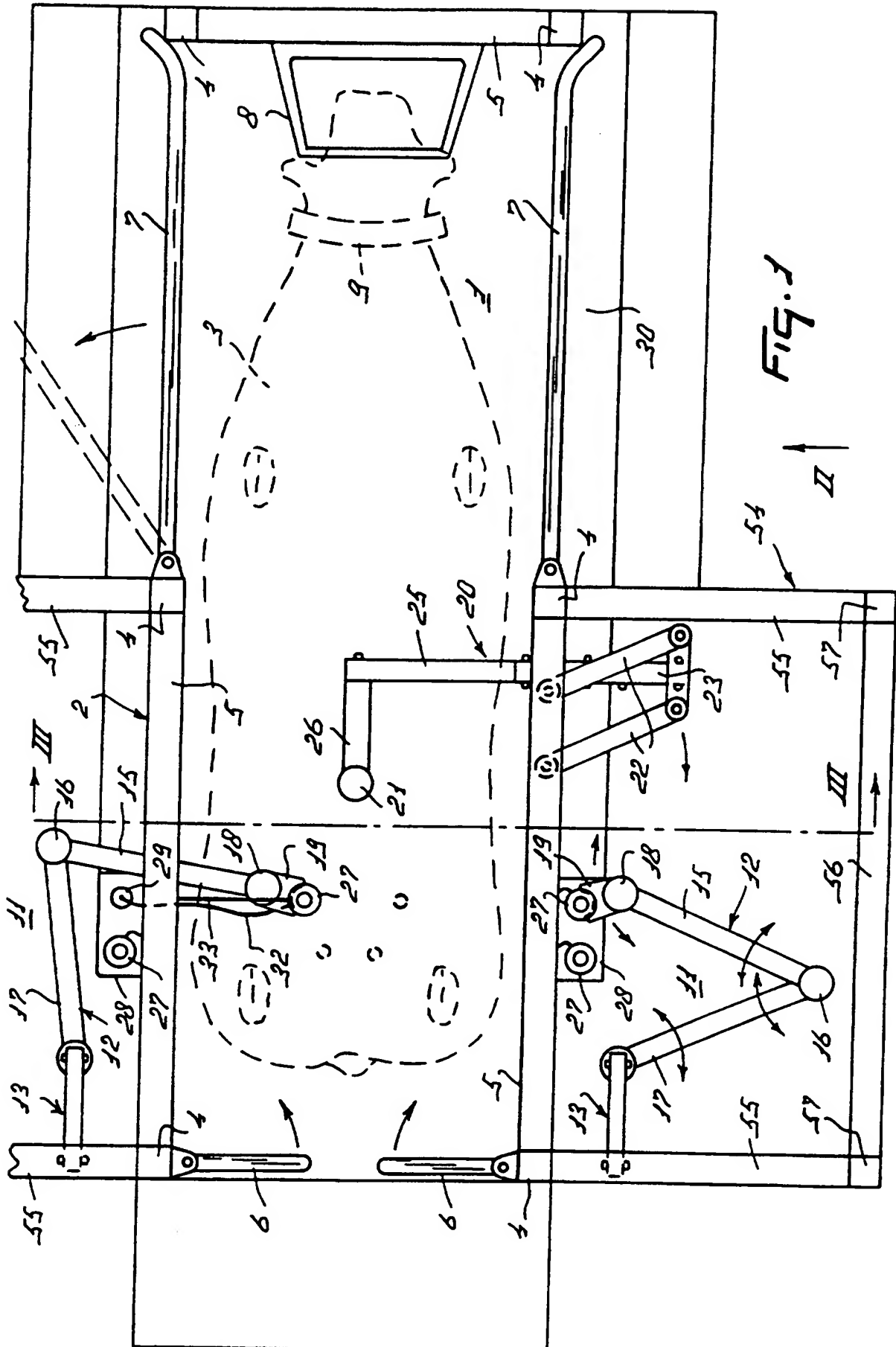
27. An implement according to claim 26, characterized in that the gripper (19) is provided with a recess curved in accordance with the shell of a teat cup (27), and that the gripper comprises an electromagnet.

28. An implement according to claim 26 or 27, characterized in that a robot arm (12) is disposed on each side of the milking parlour (1).

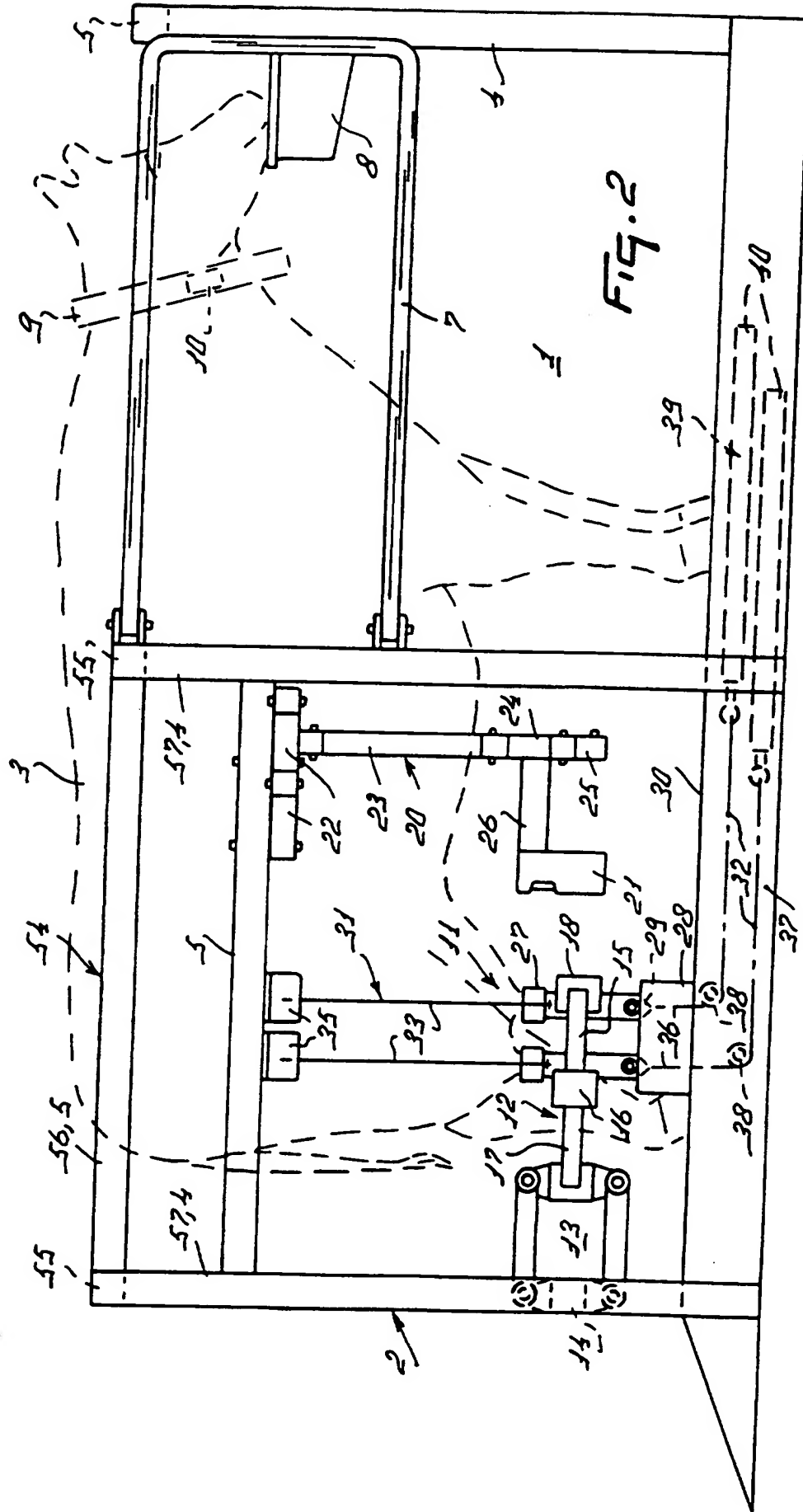
29. An implement according to any one of claims 5 to 28, characterized in that the implement is equipped with a robot arm (20) provided with a detector (21), such as a laser sensor, to determine the positions of the teats of an animal to be milked.

30. An implement according to claim 29, characterized in that the robot arm (20) provided with the detector (21) is disposed on a longitudinal side of the milking parlour (1), and that the robot arm (20) is movable in height.

1/3



2/3



3/3

